

[illegible]

## PROGRAMMING CODE APPENDIX A

```

1  NEW      GOTO 60:REM      ***I/O stepper (I=$ (0), O=z(72))***
3  IF (XBY(65507).AND.64)=0 THEN Z(0)=XBY(65506) : GOTO 3
4  DO : WHILE (XBY(65507).AND.128)=128
5  I=0 : DO : I=I+1 : XBY(65506)=ASC$(0,I)
6  WHILE ASC$(0,I)<>13 : RETURN
7  DO : WHILE (XBY(65507).AND.64)=64
8  I=0 : DO : Z(I)=XBY(65506)
9  I=I-1 : UNTIL Z(I-1)=32 : RETURN

10 REM      ***error check***
15 IF TX<0 THEN TX=0
16 RETURN
20 IF TX<-251 THEN TX=-251
21 RETURN
25 IF TX>251 THEN TX=251
26 RETURN

10 GOSUB 50:TP1=TP:T1=TIME
32 DO:UNTIL TIME>T1+0.2
34 GOSUB 50:TP2=TP:T2=TIME
36 SL=(TP2-TP1)/(T2-T1):IF SL<>0 THEN IT=(TG-TP2)/SL
38 PRINT USING(###.##), "SL=",SL,"IT=",IT,"AT TEMP=",TP2
40 IF IT>1 GOTO 30
42 RETURN

49 REM      ***temperature measurement***
50 E=XBY(65504):F=XBY(65505):G=XBY(65504):TP=(F*256+G+300)/38.3: RETURN

60 CLEAR : STRING 150,72 : DIM Z(72)
72 DTEMP=95:DTIM=1:DS=10
74 ATEMP=60:ATIM=1:AS=20
76 ETEMP=74:ETIM=15:ES=1:CYCLE=100
80 PRINT USING(###), "*",TAB(20),"TEMP",TAB(30),"TIME",TAB(40),"SLOPE"
82 PRINT "1) DENATURATION", TAB(30),DTEMP,TAB(30),DTIM,TAB(40),DS
84 PRINT "2) ANNEALING", TAB(20),ATEMP,TAB(30),ATIM,TAB(40),AS
86 PRINT "3) EXTENSION", TAB(20),ETEMP,TAB(30),ETIM,TAB(40),ES
88 PRINT "4) CYCLES", CYCLE:PRINT
110 INPUT "TYPE # TO CHANGE OR 0 IF OK (CHOICES ARE 0,1,2,3, OR 4)?",J
114 IF J=0 THEN GOTO 170
116 ON J GOSUB ,120,130,150,160
118 PRINT:GOTO 80
120 INPUT "ENTER DENATURATION Temp, Time, Slope: ",DTEMP,DTIM,DS
125 IF DTEMP>98 GOTO 130
126 RETURN
130 INPUT "ENTER ANNEALING Temp, Time, Slope: ",ATEMP,ATIM,AS
140 IF AS<0 GOTO 130
142 IF AS>21 GOTO 130
145 RETURN
150 INPUT "ENTER EXTENSION Temp, Time, Slope: ",ETEMP,ETIM,ES:RETURN
160 INPUT "ENTER Number of Cycles:",CYCLE:RETURN
170 $(0)="mr1 500;sp1 100;hf1 2;rt2 1;ear": GOSUB 3 : GOSUB 7
175 FOR I=0 TO 10 : PRINT CHR(Z(I)), : NEXT I : PRINT

200 $(0)="gol nd;hf1 2;wfo =x...;sl":GOSUB 3: rem open
210 PRINT "WAIT FOR COOLING":XBY(65504)=3
220 DO : GOSUB 50 : UNTIL TP<45
230 PRINT "TEMP=",TP," LOAD SAMPLES AND THEN PRESS A KEY"
240 W=GET : IF W=0 GOTO 240

300 TMC=0:WS=0: CLOCK 0 : TIME=0 : DBY(71)=0 : CLOCK 1
305 $(0)="hf1 1;sp1 100;gol;wfo =x...;sl":GOSUB 3: REM CLOSE
310 FOR V=1 TO CYCLE
315 PRINT "D", : TG=DTEMP:XBY(65509)=4:IF V=1 THEN TG=DTEMP+(DS/4)

```

```

320 WS=(DS*10+WS*9)/10:TX=INT(WS+0.5):GOSUB 15
325 XBY(65508)=TX:GOSUB 50:IF TP>TG GOTO 340
330 IF TX<>DS*10 GOTO 320
333 GOSUB 30
335 GOSUB 50:IF TP<TG GOTO 335
340 TG=OTEMP:EB=TIME
345 WS=(5*WS+10*(TG-TP))/7:TX=INT(WS+0.5)
350 IF TX>=0 THEN GOSUB 25:XBY(65508)=TX:XBY(65509)=4
355 IF TX<0 THEN GOSUB 20:XBY(65508)=0:XBY(65509)=4-TX
360 IF V=1 THEN IF DTIM+5>(TIME-EB) GOTO 380
370 IF DTIM<(TIME-EB) GOTO 500
380 GOSUB 50: GOTO 345

500 PRINT "A",:XBY(65508)=0:TG=ATEMP
845 S(0)="spl 200;gol nd;hfl 2;wfo =x...;sl":GOSUB 3: rem open
855 XBY(65509)=AS*10
860 GOSUB 30
890 EB=TIME:WS=-AS*10
913 WS=(4*WS+20*(TG-TP))/5:TX=INT(WS+0.5)
915 IF TX>=0 THEN GOSUB 25:XBY(65508)=TX:XBY(65509)=4
918 IF TX<0 THEN GOSUB 20:XBY(65508)=0:XBY(65509)=4-TX
920 IF ATIM+1<(TIME-EB) GOTO 925
924 GOSUB 50: GOTO 913

925 PRINT:PRINT "B",:XBY(65509)=4:TG=STEMP+1
930 S(0)="hfl 1;spl 50;gol;wfo =x...;sl":GOSUB 3:WS=0: REM CLOSE
935 WS=(AS*10+WS*9)/10:TX=INT(WS+0.5):GOSUB 15:GOSUB 25:XBY(65508)=TX
937 GOSUB 50:IF TP>TG-1 GOTO 970
940 IF TX<>ES*10 GOTO 935
950 GOSUB 50: IF TP<TG-1 GOTO 950
970 EB=TIME
980 WS=(WS+5*(TG-TP))/3:TX=INT(WS+0.5)
983 IF TX>=0 THEN GOSUB 25:XBY(65508)=TX:XBY(65509)=4
987 IF TX<0 THEN GOSUB 20:XBY(65508)=0:XBY(65509)=4-TX
990 IF ETIM<(TIME-EB) GOTO 1000
995 GOSUB 50: GOTO 980
1000 CTIM=TIME-TMC: TMC=TIME: PRINT "CYCLE=",V,"TIME=",CTIM
1050 NEXT V

1055 XBY(65508)=0:XBY(65509)=255
1060 INPUT "STRAND REANNEALING (Y/N) ?",$1)
1070 IF ASC($1,1)=78 GOTO 1290
1100 PRINT "STRAND REANNEALING IN PROCESS..."
1110 TG=OTEMP:XBY(65509)=4
1120 WS=(DS*10+WS*9)/10:TX=INT(WS+0.5):GOSUB 15
1130 XBY(65508)=TX:GOSUB 50:IF TP>TG GOTO 1170
1140 IF TX<>DS*10 GOTO 1120
1150 GOSUB 30
1160 GOSUB 50:IF TP<TG GOTO 1160
1170 EB=TIME
1180 WS=(11*WS+10*(TG-TP))/12:TX=INT(WS+0.5)
1185 IF TX>=0 THEN GOSUB 25:XBY(65508)=TX:XBY(65509)=4
1190 IF TX<0 THEN GOSUB 20:XBY(65508)=0:XBY(65509)=4-TX
1193 IF 5<(TIME-EB) GOTO 1200
1196 GOSUB 50: GOTO 1180
1200 XBY(65508)=0:XBY(65509)=255:WS=0
1210 DO:GOSUB 50:UNTIL TP<75

1220 EB=TIME
1230 WS=(WS+3*(75-TP))/2:TX=INT(WS+0.5)
1240 IF TX>=0 THEN GOSUB 25:XBY(65508)=TX:XBY(65509)=4
1250 IF TX<0 THEN GOSUB 20:XBY(65508)=0:XBY(65509)=4-TX
1260 IF 60<(TIME-EB) GOTO 1280
1270 GOSUB 50: GOTO 1230

```

44090-2269800

[illegible]